

REMARKS

With entry of the foregoing amendments, claims 1-15 are pending in the application. The specification has been amended to correct grammatical and typographical errors on pages 1, 7 and 9 as requested by the Examiner. The specification has also been amended at page 6, line 10, and line 14 to insert that the "precipitation electrode" is not shown in the drawing. Claim 2 has been rewritten in independent format to include all the limitations of claim 1 and amended to improve its form. Claims 1, 3, 5 and 6 have been amended to correct grammatical errors. No new matter has been added.

Applicants wish to thank the Examiner for her indication that claims 2 and 3 contain allowable subject matter. As noted, claim 2 has been rewritten in independent form to include the limitations of claim 1. Claim 3 depends from claim 2, and should also be allowable.

The specification and claim 5 were objected to as having certain informalities. Claims 1 and 4-15 stand variously rejected under 35 U.S.C. §§ 102(b) and 103 (a). Applicants respectfully traverse the rejections, and request that the rejections be reconsidered in view of the foregoing amendments and the following remarks.

Objections

The specification was objected to as having certain grammatical and typographical errors. The specification has been amended to correct such informalities. Claim 5 was also objected to as requiring commas between certain terms of the claim. Claim 5 as well as other claims, namely claims 1, 3 and 6 that had similar informalities, have been corrected.

Rejections Under 35 U.S.C. § 102(b)

Independent Claim 1 and Dependent Claims 4, 6 and 13-14

Claims 1, 4, 6, and 13-14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by JP 2000-290660 to Watabe ("Watabe"). To anticipate a claim, a reference must teach every element of the claim:

'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.'
Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). 'The identical invention must be shown in as

complete detail as is contained in the ... claim.' Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

MPEP § 2131.

At the outset, applicants would emphasize that they have found that the pressing of feedstock between the rotatable surface and the ablative surface, combined with the movement of the feedstock along the ablative surface, provides a surprisingly efficient thermolysis system. Combined with a cylindrical ablative surface, the ablative thermolysis reactor, as recited, e.g., in claim 1, allows the effective transfer of heat to the feedstock so that the use of inert or transport gas can be minimized. The reactor in accordance with the invention is particularly suited to large scale operation, such as would be required in a viable commercial process.

Although the Examiner asserts that Watabe discloses all the limitations of claim 1, a careful review of the cited reference shows that Watabe does not disclose the combination of the rotatable surface and ablative surface as recited in claim 1, in that feedstock is pressed between the rotatable surface and the ablative surface and moved along the ablative surface, to thermolyze the feedstock. Instead, Watabe appears to disclose mere stirring and agitation of feedstock within chamber 2. Further, Watabe refers to element 7 as an impeller attached to churning shaft 6. This clearly shows that the function of these elements of Watabe is for agitation or stirring of the feedstock, not for pressing the feedstock against an ablative surface. Accordingly, Watabe neither anticipates nor renders obvious claim 1.

Claims 4, 6 and 13-14 depend from allowable claim 1, and therefore, should be allowable. Claims 4, 6 and 13-14 may recite additional patentable subject matter for reasons not explicitly disclosed herein. These claims are also not anticipated or rendered obvious by Watabe, and allowance of same is earnestly solicited.

Rejections under 35 U.S.C. § 103(a)

Dependent Claims 5, 7 and 9-11

Claims 5, 7, and 9-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe in view of JP 11-216444 to Aida et al ("Aida").

The Examiner has rejected claim 5, stating that Watabe does not teach a rotatable surface **mounted outwardly** of the ablative surface and arranged to press feedstock toward the

axis of rotation. However, claim 5 does not recite “a rotatable surface mounted outwardly of the ablative surface and arranged to press feedstock toward the axis of rotation.” Rather, claim 5 recites “rotatable surface is **mounted inwardly** of the ablative surface and arranged to press feedstock **away** from the axis of rotation. “ Applicants have assumed that the Examiner indeed meant to reject claim 5, since the Examiner has indicated that “a reaction vessel bounded by an inner wall with the ablative surface being defined by an **outwardly facing** surface of said inner wall” was not found in the prior art. (See Office Action of 9/5/2007, page 8).

In any event, neither Watabe nor Aida, alone or in combination, discloses or suggests a reaction vessel with “rotatable surface is mounted inwardly of the ablative surface and arranged to **press** feedstock away from the axis of rotation “as recited in claim 5. As discussed above, Watabe’s elements are for agitation and stirring. Similarly, Aida discloses a carbonization treating device in which a stirring member 12 rotates to **stir** feedstock in the carbonization chamber 4. In one embodiment in Aida, a hinged vane 20 is provided at the end of stirring member 12. The only disclosure in Aida is that this provides the advantage of avoiding jamming of the stirring member during its rotation. Nowhere does Aida indicate that this feature provides any improvement to the carbonization process, other than avoiding jamming of the stirring member 12. The hinged vane merely acts as a “wiper” to keep the surface of chamber 4 clean. It does not exert pressure to assist thermolysis.

Neither Watabe nor Aida discloses that pressing and moving the feedstock against the ablative surface can have beneficial effects on the efficiency of thermolysis in the reaction. Accordingly, there is no teaching or suggesting to the skilled person based on Watabe or Aida to modify the disclosure of either of those documents in order to reach the advantageous reactor structure recited in claim 5

Claim 7 recites that “at least one rotatable surface is in the form of a rotatable blade.” The Examiner acknowledges that Watabe does not teach such a limitation. The Examiner nonetheless asserts that Watabe’s plates and rotating impellers combined with Aida’s plate-like stirring member somehow yield a rotatable surface in the form of a rotatable blade. It is not known how the combination of two stirrers, Watabe’s impeller stirrers and Aida’s plate stirrers, effectively decreases the size of the waste feedstock as asserted by the Examiner. Nowhere do Watabe or Aida, alone or in combination, disclose or suggest the invention as a whole recited in claim 7.

Claim 9 recites a reactor wherein “said heating means is arranged to heat the ablative surface by electrical heating, by the combustion of a solid, liquid or gaseous fuel, by condensation of a vapour, or by circulation of a hot fluid.” The Examiner has rejected claim 9 on the basis that such heating means are disclosed in Watabe. However, upon examination, Watabe only discloses the combustion of “heavy oil” to heat the ablative surface. Thus, Watabe does not teach or suggest all of the elements of claim 9. Furthermore, even if Watabe did disclose all of the heating means listed in claim 9, claim 9 depends from allowable claim 7, and the claimed invention as a whole, as recited in claim 9, is not disclosed or suggested in any combination of references. Accordingly, claim 9 is allowable.

The Examiner rejected claim 10 over Watabe in view of Aida as together teaching means to “adjust the angle of the rotatable surface, or front surface of each blade when present, relative to the ablative surface.” In the Examiner’s view, it would have been obvious to combine the “plates and rotating impellers of Watabe” with the “pivotable plate-like stirring members” of Aida in order to produce an adjustable ablative surface. As discussed above, with respect to claim 5, Aida teaches a hinged vane 20 at the end of stirring member 12. The only disclosure in Aida is that this provides the advantage of avoiding jamming of the stirring member during its rotation. Nowhere does Aida indicate that this feature provides any improvement to the carbonization process, other than avoiding jamming of the stirring member 12. The hinged vane merely acts as a “wiper” to keep the surface of chamber 4 clean. It does not exert pressure to assist thermolysis.

Based upon the teachings of Watabe and Aida, a combination of the two references would produce a rotating plate with a hinged vane to wipe material from the ablative surface. The resulting structure is materially different from that disclosed in claim 10. Claim 10 is directed to an adjustment mechanism that allows the rotatable surface to be optimized for pressing the material to be ablated against the ablation surface, rather than wiping it away. (See further description in specification, page 7, and FIG. 2 of the application.) Therefore, Applicants submit that Watabe in combination with Aida does not teach the limitation of claim 10. Furthermore, since claim 10 depends from allowable claim 1, the invention as a whole, recited in claim 10, is not disclosed or suggested in any combination of references. Accordingly, claim 10 is allowable.

The Examiner also rejected claim 11, dependent upon claim 10, and teaching the further limitation that “angle adjustment means are provided to adjust independently each rotatable

surface or blade when present.” In the Examiner’s view, the combination of Watabe and Aida discussed above teaches all of the elements of claim 11. Applicants, however, maintain that the combination of Watabe and Aida produces a rotatable surface for wiping material from the ablative surface rather pressing material against the ablative surface. Therefore, Applicants submit that Watabe in combination with Aida does not teach the limitation of claim 11. Furthermore, since claim 11 depends from allowable claim 10, the invention as a whole, recited in claim 11, is not disclosed or suggested in any combination of references. Accordingly, claim 11 is allowable.

Dependent Claim 15

Claim 15 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe in view of U.S. Patent 4,308,103 to Rotter (“Rotter”).

Claim 15 recites that the “reactor is provided with a continuous feed mechanism for supplying feedstock into said reaction vessel.” The Examiner is understood to acknowledge that Watabe does not teach a reactor provided with such a continuous feed mechanism for supplying feedstock. The Examiner asserts, however, that Rotter cures the deficiency of Watabe. Applicants certainly do not disagree that Rotter teaches some sort of conventional continuous feed mechanism for its vessel. However, claim 15 is dependent on allowable claim 1, and the claimed invention as a whole, as recited in claim 15, is not disclosed in any combination of references. Accordingly, claim 15 is allowable.

Dependent Claim 8

Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Watabe. The Examiner acknowledges that Watabe does not disclose a heating means adapted to heat the ablative surface to a temperature in the range of from about 400 ° C to about 700 °C as recited in claim 8. The Examiner nonetheless asserts that it would have been obvious to provide such heating means as the provision of same requires nothing more than routine skill to discover optimum or workable ranges. The Examiner is understood to mean that discovering optimum temperature ranges is routine and providing a heating means that is adapted to heat an ablative surface is somehow obvious. Yet there is nothing of record that discloses or teachings such a heating means as recited in claim 8. Moreover, claim 8 depends from allowable claim 1, and the claimed invention as a whole, as recited in claim 8, is not disclosed or suggested in any combination of references. Accordingly, claim 8 is allowable.


In summary, none of the cited references, alone or in combination, disclose, teach or suggest applicants' invention as recited in claims 1 and 4-15. Reconsideration and withdrawal of the rejections is respectfully requested.

The Examiner has also made of record U.S. Patent 5,424,039 to Hirai, but has not relied on this reference as the basis for any rejection. Hirai neither discloses nor suggests applicants' invention as claimed.

CONCLUSION

Applicant respectfully submits that all pending claims are in condition for allowance. Favorable consideration and allowance of claims 1-15 are therefore respectfully requested. The Examiner is urged to contact the undersigned at the number noted below, should any issues remain.

Respectfully submitted,



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